
Species-specific maturation profiles of human, chimpanzee and bonobo neural cells.

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Public Summary:

On this manuscript, we explore neural differences between humans and other close primates, such as the chimpanzees. The goal was to contrast how human neurons develop and mature. We found that fundamental processes related to neurodevelopment, such as cell migration and neuronal maturation are unique to our species. The study provides a platform to understand the complexity of our brain and why neurodevelopmental diseases are more frequent in humans.

Scientific Abstract:

Comparative analyses of neuronal phenotypes in closely related species can shed light on neuronal changes occurring during evolution. The study of post-mortem brains of nonhuman primates (NHPs) has been limited and often does not recapitulate important species-specific developmental hallmarks. We utilize induced pluripotent stem cell (iPSC) technology to investigate the development of cortical pyramidal neurons following migration and maturation of cells grafted in the developing mouse cortex. Our results show differential migration patterns in human neural progenitor cells compared to those of chimpanzees and bonobos both in vitro and in vivo, suggesting heterochronic changes in human neurons. The strategy proposed here lays the groundwork for further comparative analyses between humans and NHPs and opens new avenues for understanding the differences in the neural underpinnings of cognition and neurological disease susceptibility between species.

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